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FIRST PROGRESS REPORT OF THE TOBACCO INDUSTRY RESEARCH COMMITTEE

GRANT-IN-AID STUDY OF

"THE EFFECTS OF CIGARETTE SMOKING ON NORMAL SUBJECTS AND PATIENTS
WITH PULMONARY DISEASE"

- able for W.F.'s work?*
1. Our initial efforts have been spent in more fully equipping the laboratory so that the more important aspects of the Mechanics of Breathing could be studied. A used but adequate fluoroscopic unit, two additional transducers for instantaneous air flow rate studies (pneumotachography) were obtained and an electrical unit to permit direct recording of the air volume flows by integration from the pneumotachograph tracings was constructed. At the present time we are attempting to actually record the intensity of cough on a plastic belt play-back recording unit (loaned to us for this purpose) and to simultaneously integrate these frequency responses with our recorded intraesophageal pressures, instantaneous air flow rates, volume rates and venous and arterial pressures. This would permit an objective physiologic correlation of the effects on the cardiopulmonary apparatus of both spontaneous and induced cough in both the normal subject and the patient with pulmonary disease. It should permit an accurate physiologic analysis of the so-called "tobacco cough" and the "bronchitic cough," which we need for the Second Phase of our planned studies.
 2. The controls necessary for a study involving the complicated factors in the Mechanics of Breathing were first evaluated. The effects of various positions and the degree of distention of the esophageal balloons employed in our pressure-volume studies had to be determined, before the various factors involved in the mechanics of breathing could be evaluated. The mechanics of breathing were then studied in 11 normal subjects and 27 patients with pulmonary disease. In the normal subjects there were: One non-smoker; six moderate smokers (up to 1 package daily); and four heavy smokers (more than one package daily). In the patient group there were three non-smokers; 18 moderate smokers and six heavy smokers. Three patients were studied on two or more occasions and two patients were studied after a period of several weeks of abstinence from smoking.
 3. It was then considered advisable to evaluate the Positional Factors involved in the mechanics of breathing. Seven normal subjects and seventeen patients with pulmonary disease were studied in different body positions. This data is presently being correlated and will be the subject of at least two basic papers in pulmonary physiology. From these studies it becomes essential that the effect of body positions be considered in all studies involving the effects of drugs and therapeutic agents on the mechanics of breathing. Comparison studies of these effects have little value unless the physiologic effects of body positions alone are understood and taken into consideration.

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4. Acute studies have been started on the effects of smoking one or two cigarettes on the mechanics of breathing. One normal subject and four patients with pulmonary disease have been fully studied. One patient showed a decrease in compliance (increased stiffness of the lung) during quiet breathing with an accentuation of this drop during rapid breathing and an increase in mechanical resistance. In the other four subjects the mechanics of breathing were improved after smoking during normal breathing, timed vital capacity efforts and during cough ("exhorted").

These numbers are too small for any conclusions and our studies along these lines are continuing.

/s/ Maurice S. Segal, M.D.

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